

Virtual Health Information Network

Initial findings and lessons learned from the catalyst projects

Dr Sheree Gibb

Virtual Health Information Network



Overview

- Background to the VHIN
- Some results from the VHIN catalyst projects
- Resources available from the VHIN and catalyst projects

Background

- NZ has excellent whole population administrative health data, linkable through NHI numbers
- New opportunities now that health data are linked to other government data through the Integrated Data Infrastructure (IDI)
- We are not realising the full potential of these data for health research- can we do more?

Virtual Health Information Network

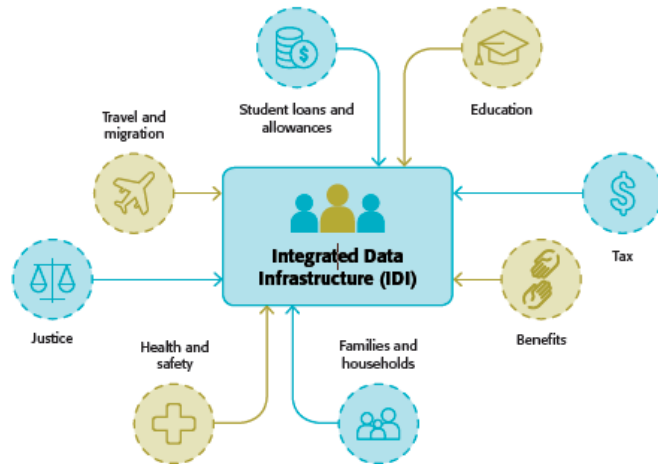
- Joint initiative between:
 - University of Otago (Tony Blakely)
 - University of Auckland (Barry Milne)
 - Massey University (Jeroen Douwes)
 - Ministry of Health
- Aim: to facilitate sharing and collaboration amongst network members in order to enhance health research outputs and improve health service delivery and health outcomes in New Zealand.

Catalyst projects

- Opportunity to demonstrate the value of the VHIN approach, and to create code, metadata and other resources for researchers
 - Getting the denominator right (Auckland)
 - Cost of CVD in New Zealand (Otago)
 - Occupational and pharmaceutical risk factors for congenital malformations (Massey)
- Projects use whole-population health data and the Integrated Data Infrastructure (IDI)

Data in the IDI July 2016

Statistics New Zealand's Integrated Data Infrastructure (IDI) is a large research database containing de-identified microdata about people and households.



The IDI contains person-centred microdata from a range of government agencies, Statistics NZ surveys including the 2013 Census, and non-government organisations. For more information about data in the IDI, see www.stats.govt.nz/idi-data.

The Longitudinal Business Database (LBD) complements the IDI with microdata about businesses. For more information about data in the LBD, see www.stats.govt.nz/lbd.

Health and safety data

- ACC injury claims – from 1994
- B4 School Checks – from 2011
- Cancer registrations – from 1995
- Chronic conditions – from 2007
- General medical services claims – from 2002
- Health tracker – 2006–13
- Laboratory claims – from 2003
- Mortality – from 1988
- Immunisation – from 2006
- National non-admitted patient collection – from 2007
- Pharmaceuticals – from 2005
- PHO enrolments – from 2003
- Population cohort demographics and addresses – from 2004
- Mental health and addiction – from 2008
- Publicly funded hospital discharges – from 1988

Justice data

- Recorded crime: offenders – from 2009
- Recorded crime: victims – from 2014
- Court charges – 1992–2013
- Sentencing and remand – from 1998

Benefits and social services data

- Benefits – from 1990
- Youth services – from 2004
- Auckland City Mission – from 1996

Tax and income data

- Tax and income – from 1999

Education and training data

- Early childhood education – 2008–15
- Primary education – from 2007
- Secondary education – from 2004
- Tertiary education – from 1994
- Industry training – from 2001
- Targeted training – from 2001

Student loans and allowances data

- Student loans and allowances – from 1992

Travel and migration data

- Driver licence and motor vehicle registers
- Border movements – from 1997
- Visa applications – from 1997
- Departure and arrival cards – from 1997
- Migrant Survey – from 2012
- Longitudinal Immigration Survey of NZ – 2005–09

Family and household data

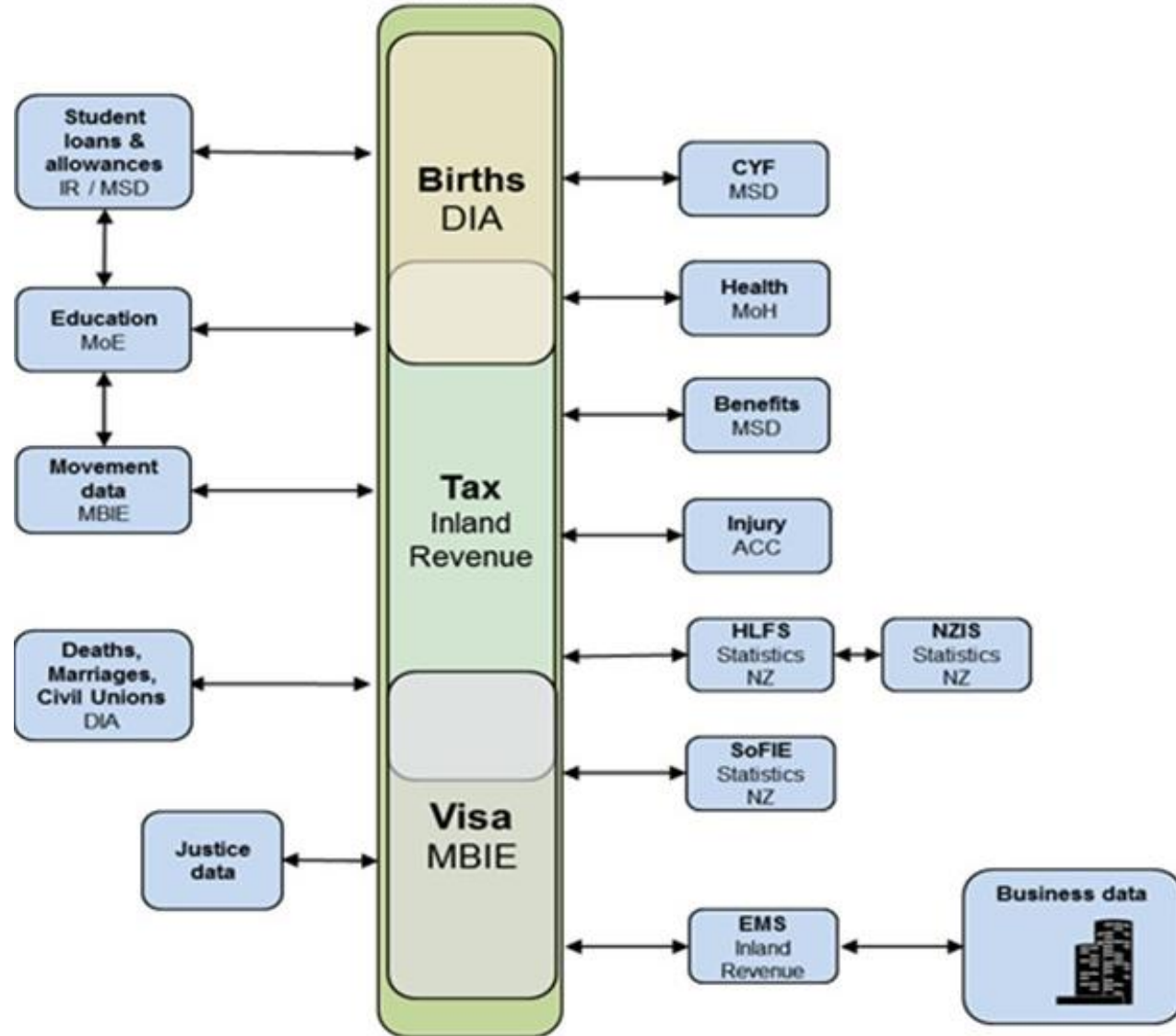
- 2013 Census
- Births, deaths, marriages, and civil unions – from 1840
- Child, Youth and Family – from 1991
- Household Economic Survey – from 2006
- Household Labour Force Survey – from 2006
- NZ Income Survey – from 2006
- Working for Families – from 2003
- Tenancy – from 2000
- Social housing – from 1980
- Survey of Family Income and Employment – 2002–10



Statistics New Zealand operates a five-safes environment, balancing privacy and confidentiality with data insights.

For information about applying to use the IDI or to learn about how we keep the data safe, see www.stats.govt.nz/idi

SPINE



Some results from the catalyst projects

Disclaimer

Access to the data presented was managed by Statistics New Zealand under strict micro-data access protocols and in accordance with the security and confidentiality provisions of the Statistics Act 1975. The findings are not Official Statistics. The opinions, findings, recommendations, and conclusions expressed are those of the researchers, not Statistics NZ.

Catalyst project 1: Risk factors for congenital malformations

Host: Massey University

Contact Andrea 't Mannetje: a.mannetje@massey.ac.nz



MASSEY UNIVERSITY
TE KUNENGA KI PŪREHUROA
UNIVERSITY OF NEW ZEALAND

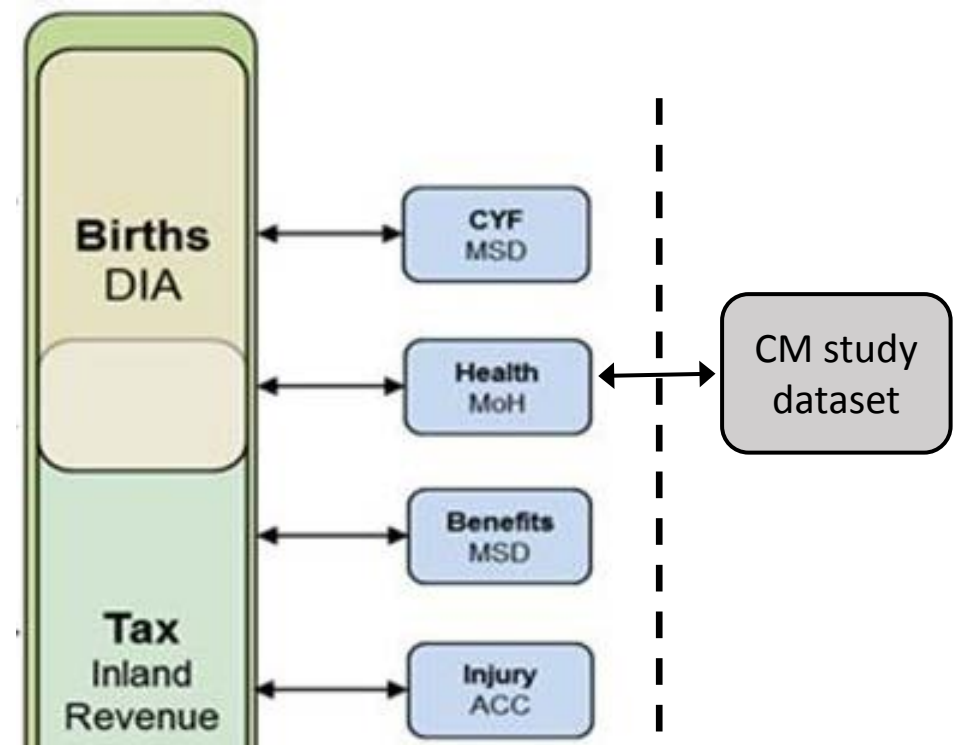
Risk factors for congenital malformations

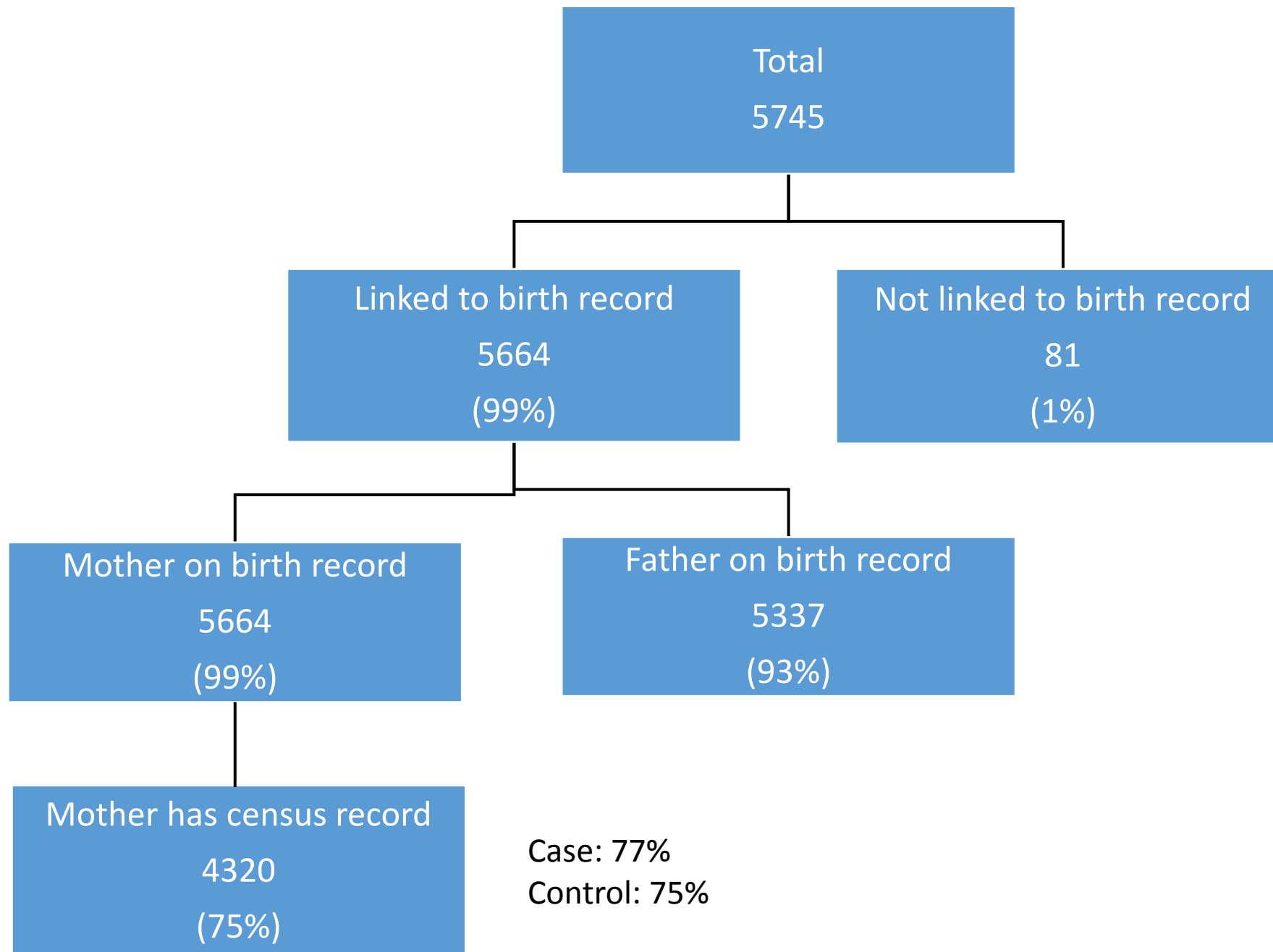
- ~2500 infants diagnosed per year, 20% of all infant deaths in NZ
- Modifiable risk factors have not been studied previously in NZ
- Overseas studies have suggested that pharmaceutical, occupational exposures may be risk factors, but sample sizes are small
- Pharmaceuticals are not typically tested for teratogenicity in clinical trials- rely on animal models

Risk factors for congenital malformations

- Existing study: 3000 babies with CM born in 2007-2009, 3000 controls
- 600 case and 600 control mothers interviewed
- Can we obtain information about the others by linking with IDI?

- Original study file linked to IDI using NHIs for the babies
- DIA birth records allow us to link infants to their parents
- Administrative data has potential advantages over interviews for pharmaceuticals
 - detailed pharmaceutical information
 - no recall bias





Folate antagonists

	OR (95% CI)		
	All CM	Circulatory	Musculoskeletal
3 months preconception	1.9 (1.2, 2.9)	2.8 (1.6, 4.9)	2.4 (1.3, 4.5)
First trimester	2.2 (1.3, 3.7)	2.7 (1.4, 5.4)	2.9 (1.4, 6.0)
Second trimester	2.1 (1.1, 4.0)	2.6 (1.1, 5.9)	2.6 (1.1, 6.3)
Third trimester	1.3 (0.8, 2.1)	1.0 (0.5, 2.2)	1.1 (0.5, 2.5)

Adjusted for baby's sex, mother's age, ethnicity, quals, smoking, nzdep, father on birth certificate

Other medications

	All CM OR (95% CI)
Diabetes medications	
3 months preconception	2.5 (1.4, 4.8)
First trimester	1.9 (1.0, 3.4)
Second trimester	2.6 (1.5, 4.5)
Third trimester	1.7 (1.2, 2.4)
Epilepsy medications (any trimester)	1.6 (1.1, 2.2)

- Adjusted for covariates
- Diabetes effect may be due to diabetes rather than medications
- Future work will look at mother's occupation at time of birth

Catalyst project 2

Getting the denominator right

Host: University of Auckland

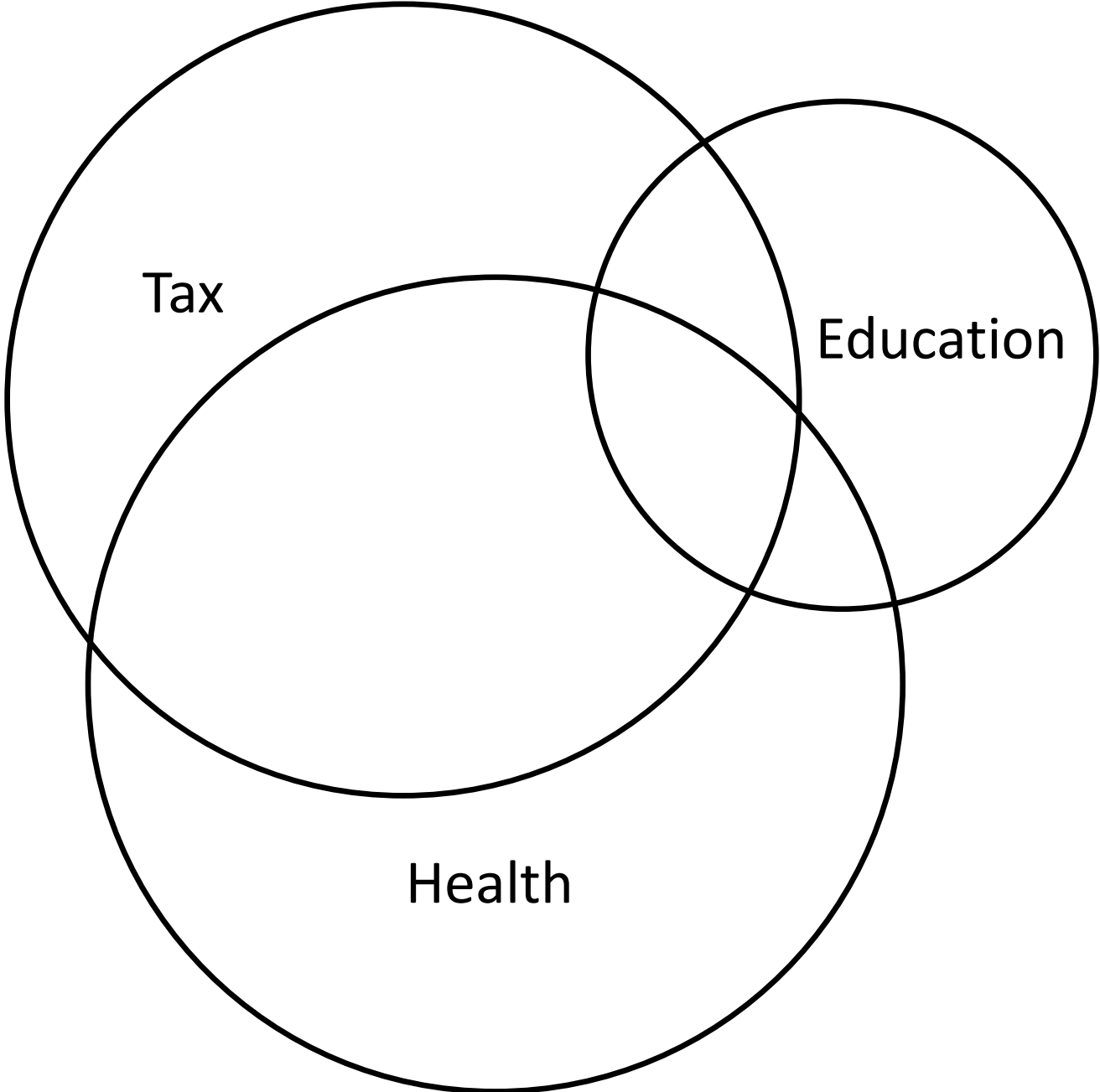
Contact Dan Exeter: d.exeter@auckland.ac.nz

Getting the denominator right

- Vascular Risk in Adult NZers 2006 (VARIANZ 2006) dataset is a detailed, individual-level cardiovascular resource
- Constructed from linked health data, captures 85% of 2006 NZ estimated resident population age 20+
- Includes baseline measures of health history and pharms dispensing, linked to 5-year mortality and hospital events
- Limitation: only includes individuals who have had recent health contact. Can we improve with IDI, and create a denominator population for other analyses?

Creating a population for VARIANZ

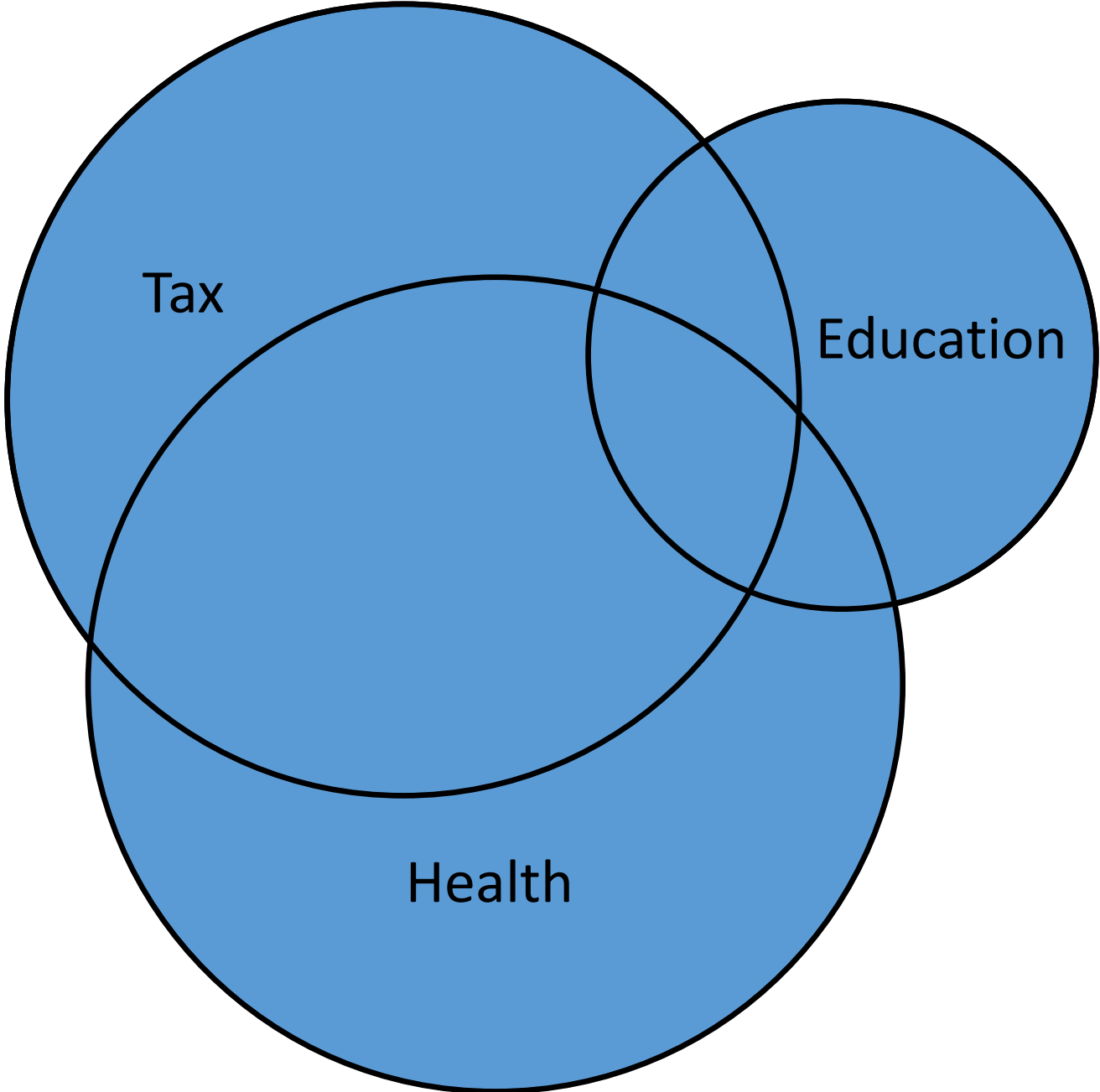
- Method based on Statistics NZ Census Transformation project
- Tax and education activity used to pick up individuals who have not had recent health contact

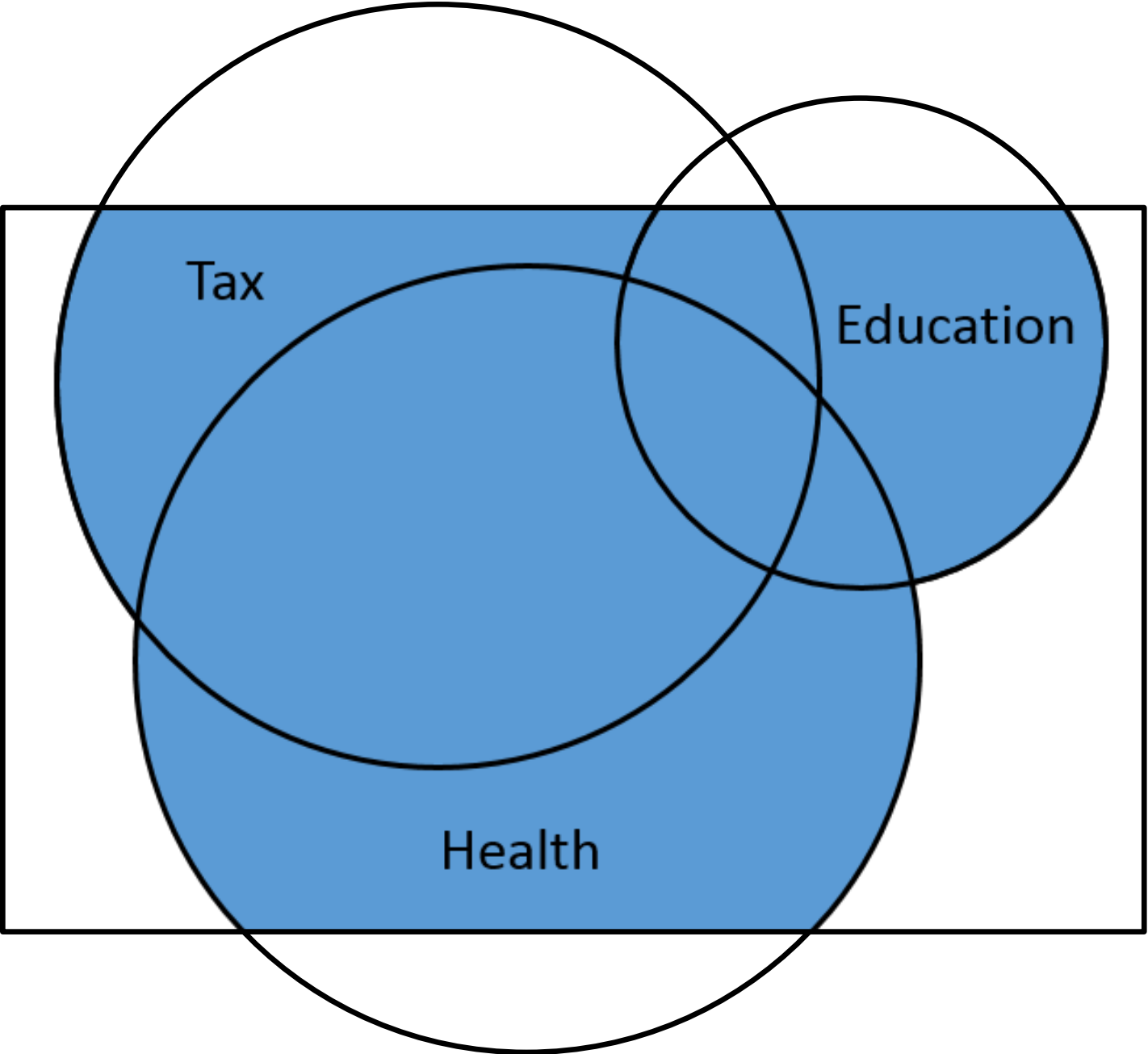


Tax

Education

Health

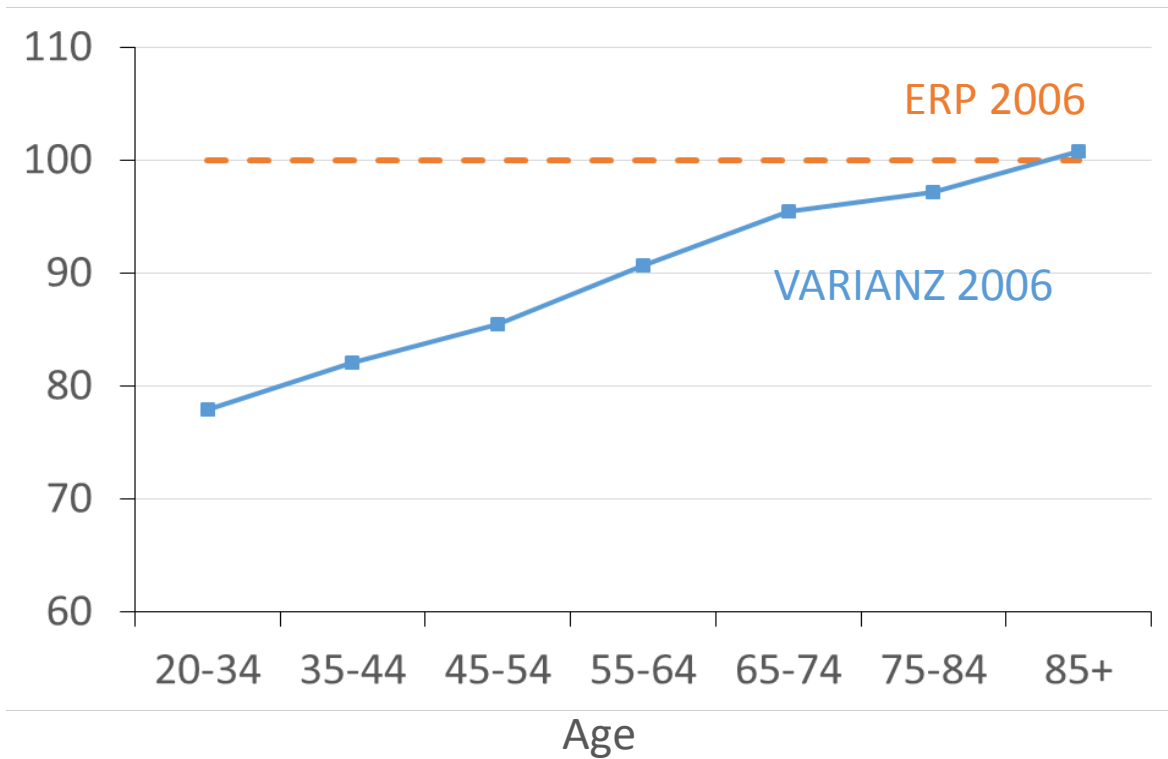




Results: population coverage

VARIANZ 2006

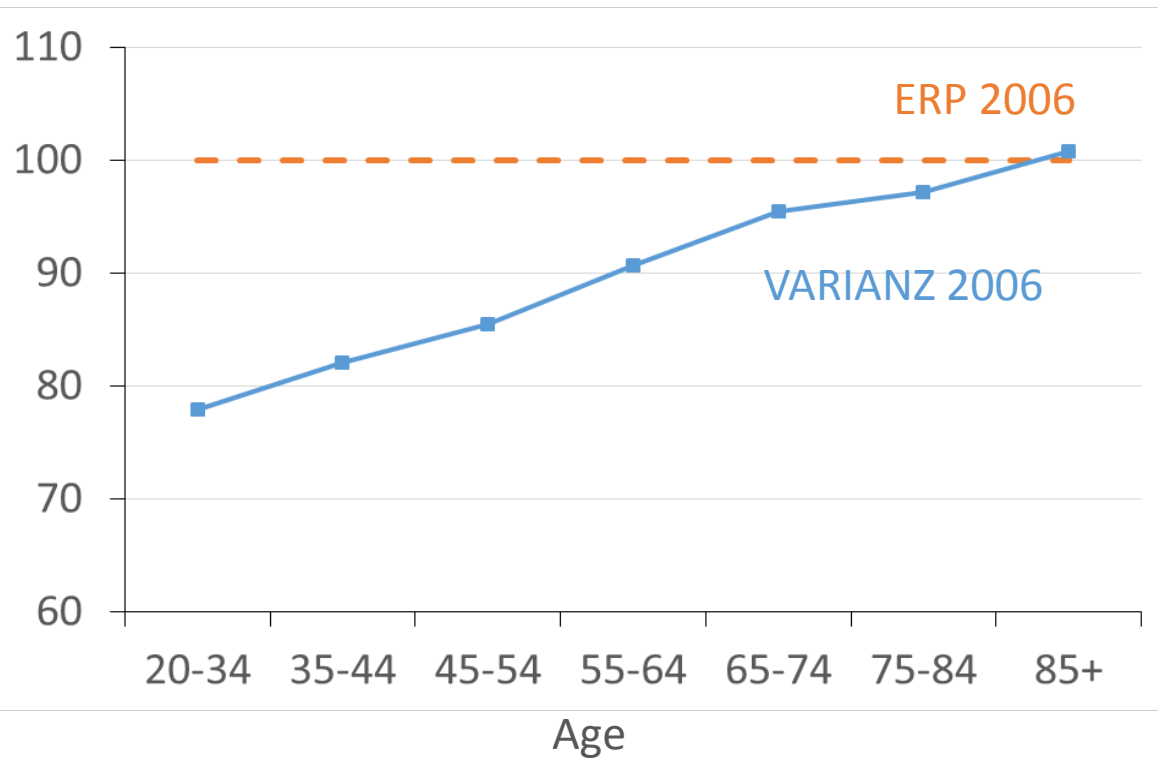
% of ERP



Results: population coverage

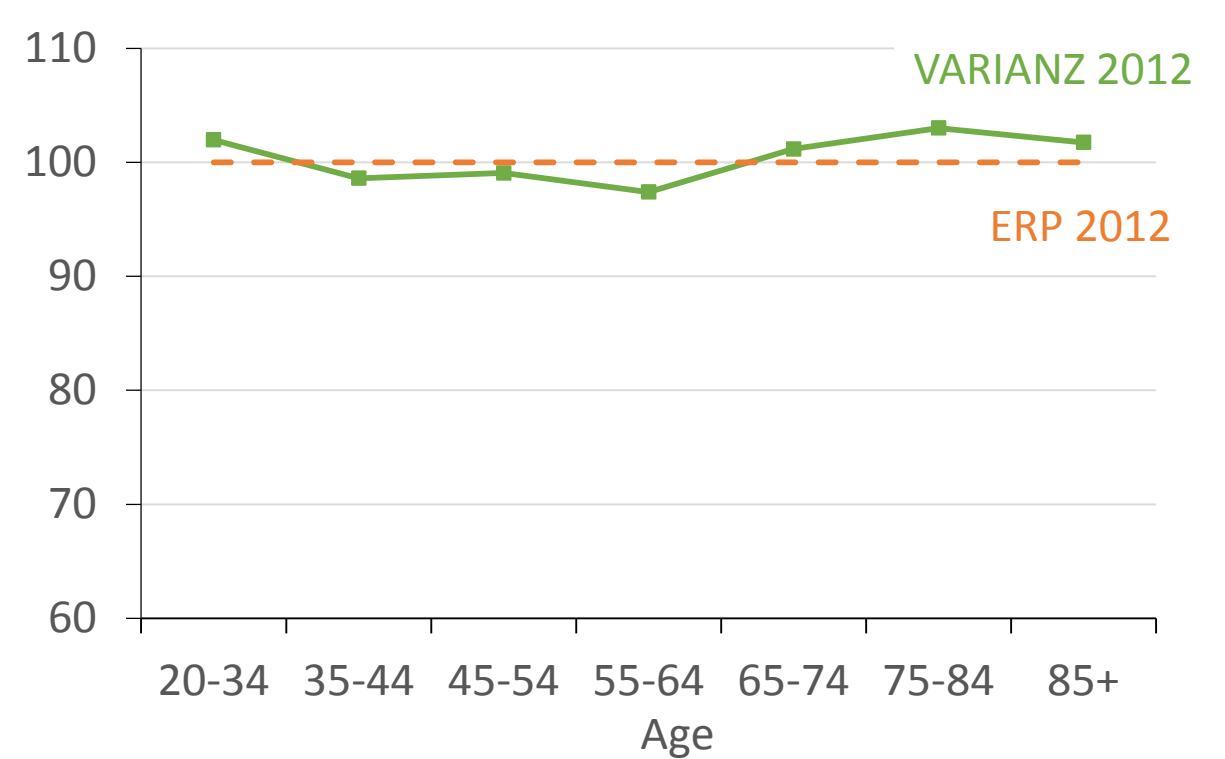
VARIANZ 2006

% of ERP



VARIANZ 2012

% of ERP



Creating the VARIANZ dataset

- We attached health information from MoH data in IDI
- Additional variables available through IDI:
 - Smoking history, qualifications, income, occupation from census
 - Migration information to tell us when individuals had moved overseas and were therefore lost to followup:

Total population at 31 December 2012	4,409,500
Still resident and alive at end 2013	97.4 %
at end 2014	95.4 %
at end 2015	94.5 %

Catalyst project 3

Costs of cardiovascular disease in NZ

Host: University of Otago

Contact Tony Blakely: tony.blakely@otago.ac.nz

or

Giorgi Kvizhinadze: giorgi.kvizhinadze@otago.ac.nz



Costs of cardiovascular disease in NZ

- Cardiovascular disease is a leading cause of death in NZ
- Cost effectiveness analyses and other models rely on estimates of the costs of CVD
- Previous studies have calculated costs for cancer
- No previous studies have calculated costs for CVD in NZ

Costs of cardiovascular disease in NZ

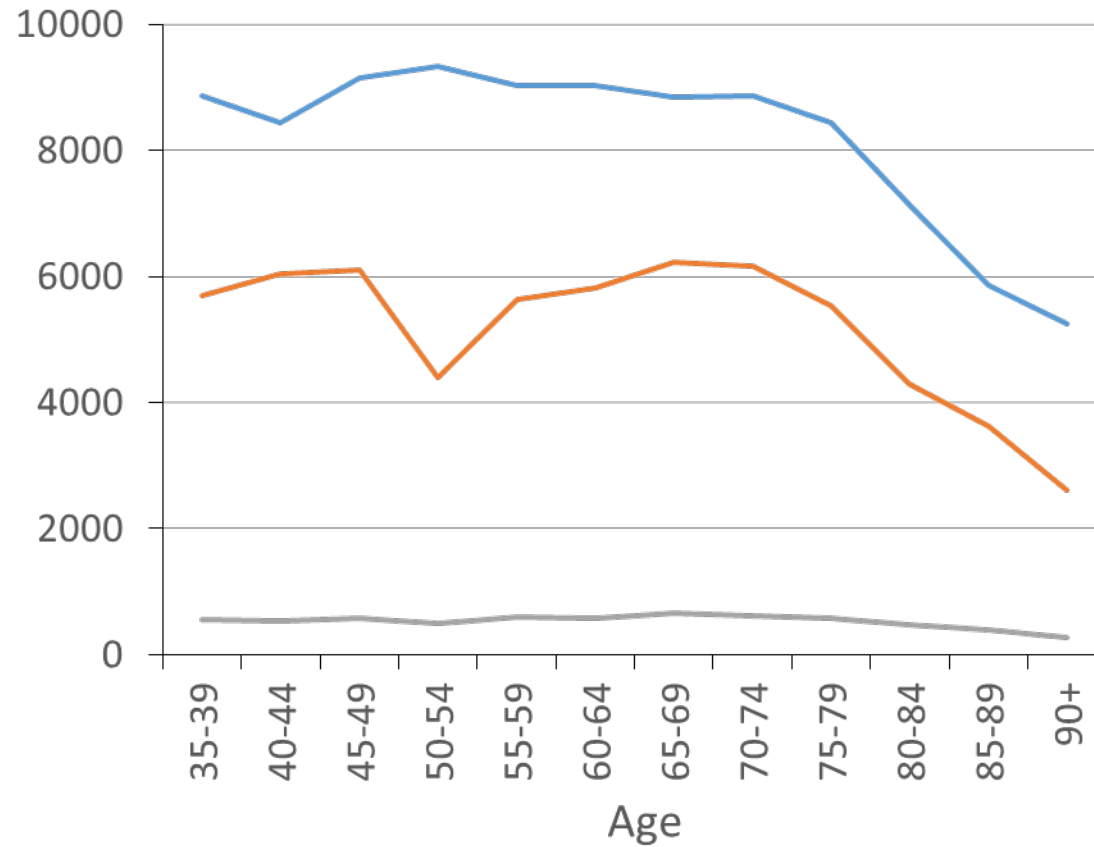
- Aim: to calculate the excess costs of CVD in NZ by age, ethnicity, time and CVD diagnosis
- 'Net excess cost' approach
- Individual-level costs are available on many national health collections, starting to be used for research
- Government health costs only, and some costs not well covered: bulk funded labs and pharmaceuticals, private treatment.

Calculating individual-level health costs

- All work done with MoH national collections (but planning to transfer to IDI in future)
- CVD diagnosis from hospital records and angina pharmaceutical dispensing
- Calculated per person costs from NMDS, NNPAC, PHO, lab claims, pharmaceuticals
- Date and cause of death from MoH death data
- Summed costs and person-time to get average monthly costs

Any CVD diagnosis

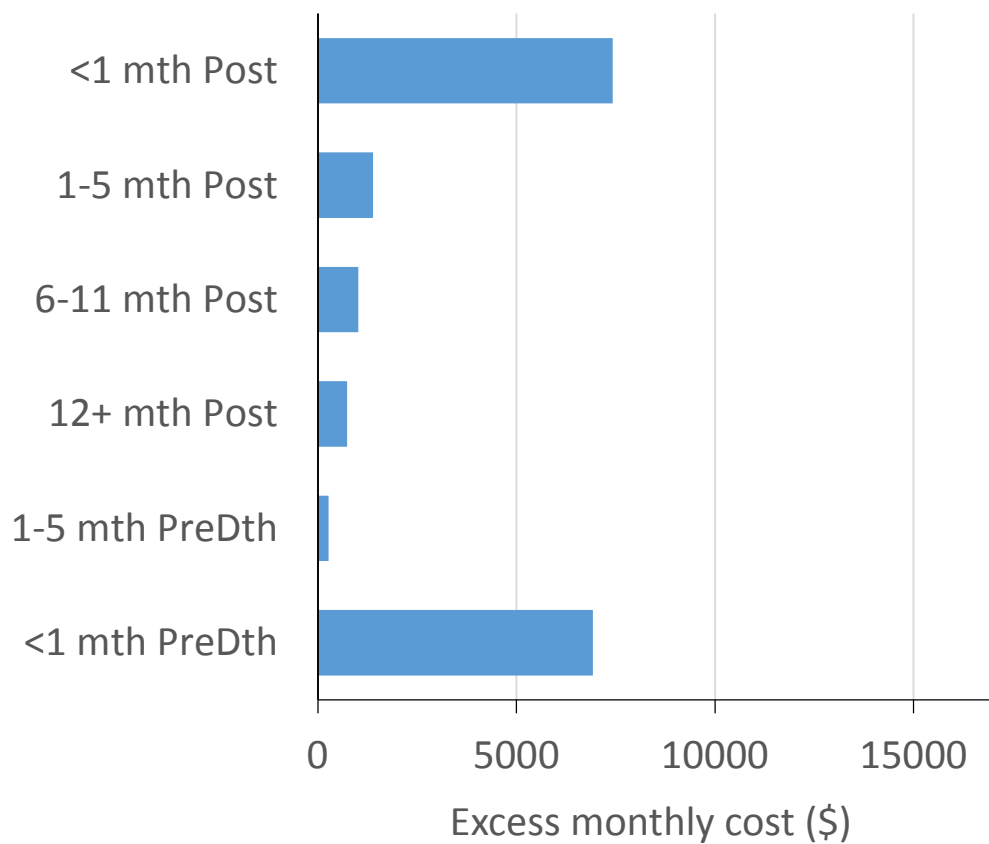
Excess monthly
cost (\$)



— <1 mth post diag — <1 mth pre dth — Prevalent

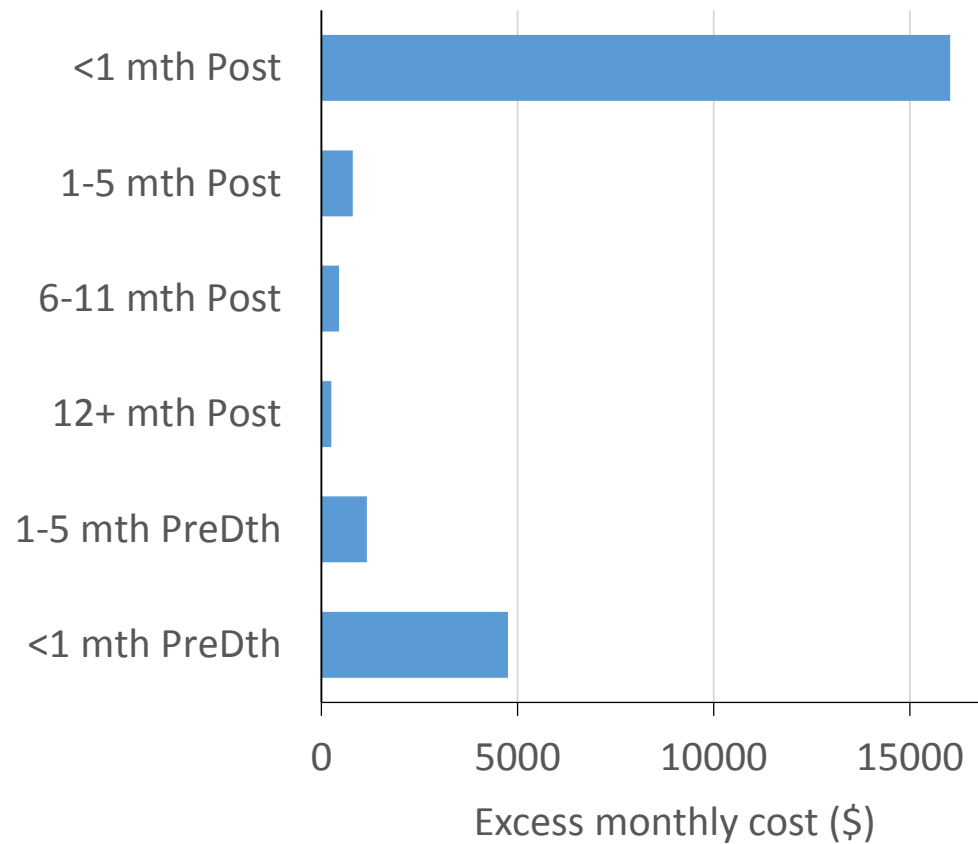
Heart failure

Males 60-64 yrs



Myocardial Infarction

Males 60-64 yrs



Next steps for CVD costs project

- Transfer methods to IDI
- Use code from 'denominator' project to improve healthy population
- Use migration information to remove time spent living overseas

Lessons from the catalyst projects

- There is value in a network approach
- There are many overlaps between projects, so sharing of code, methods is important
 - constructing a ‘healthy’ or denominator population- broad applicability, other projects using this code already
 - identifying health events eg CVD
 - identifying individuals who are lost to follow-up
- “the expertise of colleagues is crucial in being able to make the most of the efficiencies created by the overlap”

Lessons from the catalyst projects

- Whole population health data is a valuable resource for a range of research projects
- Having health data connected to other government data via IDI greatly extends the range of analyses possible
- But: this is a new area, so allow plenty of time, and be cautious

Resources available

- Ways to connect with other health researchers
- Code
- Project and analytical services

MeetaData

Site Actions ▾ [Browse](#) [Page](#) Sheree Gibb ▾

MeetaData ▸ MeetaData Discussion Boards ▸ New Discussion Boards
For expert data users to discuss, share ideas and ask questions about microdata.

[Home](#) [Manage Your Alerts](#) [User Testing Feedback](#)

MeetaData Discussion Boards

Where you can discuss, share information and ask questions

- ◆ No confidential information may be shared, including any code which has not been Phase 2 output-checked, in line with the [MeetaData User Guidelines](#).
- ◆ Note that you can receive email alerts when new posts are made by clicking 'Manage Your Alerts' above, or alternatively subscribe to a board's RSS feed - instructions on how to set up RSS alerts in Outlook can be found [here](#).

Discussions by Subject Area

Health

Discussion about health related data including Ministry of Health and ACC data, as well as the Virtual Health Information Network.

Justice

Discussion about justice related data including the Department of Corrections, NZ Police and Ministry of Justice data, as well as the Justice League.

Education

Discussion about education related data including Ministry of Education data and Student Loans and Allowances data (Inland Revenue and MSD).

Business and Employment

Discussion about business and employment related data including tax data (Inland Revenue) and the Longitudinal Business Database.

Survey Discussions

Travel and Migration

Discussion about travel and migration related data including immigration data (MBIE) and international travel and migration data (Statistics NZ).

Family and Household

Discussion about family and household related data including Working for Families research data (Inland Revenue); Child, Youth and Family data (MSD); and life event data (DIA).

Housing

Discussion about housing related data including tenancy bond data (MBIE) and Housing NZ data.

Transport

Discussion about transport related data including NZ Transport Agency data.

Census

Discussion about the Census of population and dwellings.

Other Surveys

Link to a page with discussion boards for all other surveys.

General Discussions

Integrated Data Infrastructure Structure & Methodologies

Discussion about the structure and methodologies of the IDI spine and central tables.

Microdata Access

Discussion about applying for and accessing microdata at Statistics NZ.

Code Tips and Tricks

Coding discussion not specific to any subject area.

- Statistics NZ's discussion forum for IDI
- Contact SNZ for access

Health Related Data Discussion Board

Discuss, share information and ask questions on topics relating to health data, including Ministry of Health and ACC data, and the Virtual Information Health Network

◆ Data dictionaries for the Ministry of Health data and ACC injury claims data in the Integrated Data Infrastructure can be found [here](#).

◆ Before adding a new discussion, please check your topic isn't already covered in the [Health Data FAQs](#).

 [RSS Feed](#)

Discussion Board: Health

<input type="checkbox"/> Subject	<input type="checkbox"/> Created By	Replies	Last Updated
FYI- VHIN code posted to MeetaData  NEW	Sheree Gibb	0	11/08/2016 9:46 a.m.
Is birth weight in IDI?	Robert Templeton	2	19/07/2016 2:12 p.m.
Most up-to-date IDI Data Dictionary	Kendra Telfer	0	12/07/2016 12:49 p.m.
NHI coverage within the PHO patient location data	Kendra Telfer	0	5/07/2016 3:08 p.m.
Use of publicly funded diagnosis and procedure data in the IDI	Kendra Telfer	0	4/07/2016 12:39 p.m.
Short Stay Emergency Department Events - publicly funded hospital discharges	Kendra Telfer	0	1/07/2016 3:21 p.m.
NHI coverage within Pharmaceutical Collection	Kendra Telfer	0	23/06/2016 4:05 p.m.
What is the Virtual Health Information Network?	Sheree Gibb	0	14/06/2016 10:32 a.m.
Time periods of National Collection data available in the IDI	Kendra Telfer	0	14/06/2016 8:40 a.m.

 [Add new discussion](#)

VHIN resources

- Facebook page- closed group (to join, contact Kate.Sloane@otago.ac.nz)



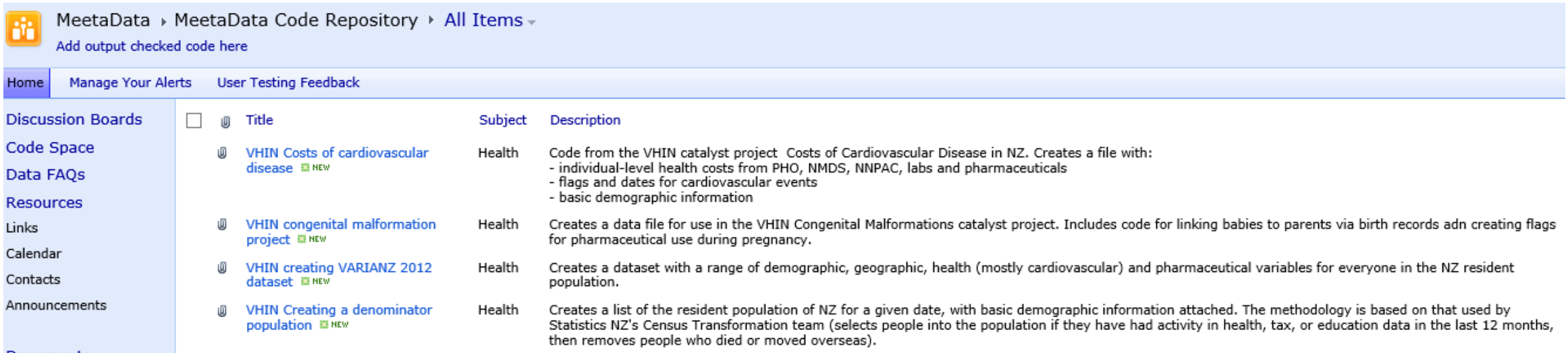
- Website under development

Code

- SAS code from VHIN catalyst projects is available for anyone to use
 - Creating a denominator population
 - Identifying CVD events
 - Estimating individual-level health system costs
 - Extracting and coding pharmaceuticals
 - Linking through birth records to get information about parents

Accessing the VHIN code

- Through the IDI wiki code sharing area if you are an IDI user
- Through MeetaData code sharing area if you are on Meetadata
 - To join MeetaData, contact SNZ



MeetaData ▸ MeetaData Code Repository ▸ All Items ▾
Add output checked code here

Home Manage Your Alerts User Testing Feedback

<input type="checkbox"/>	Title	Subject	Description
<input type="checkbox"/>	VHIN Costs of cardiovascular disease NEW	Health	Code from the VHIN catalyst project Costs of Cardiovascular Disease in NZ. Creates a file with: - individual-level health costs from PHO, NMDS, NN PAC, labs and pharmaceuticals - flags and dates for cardiovascular events - basic demographic information
<input type="checkbox"/>	VHIN congenital malformation project NEW	Health	Creates a data file for use in the VHIN Congenital Malformations catalyst project. Includes code for linking babies to parents via birth records and creating flags for pharmaceutical use during pregnancy.
<input type="checkbox"/>	VHIN creating VARIANZ 2012 dataset NEW	Health	Creates a dataset with a range of demographic, geographic, health (mostly cardiovascular) and pharmaceutical variables for everyone in the NZ resident population.
<input type="checkbox"/>	VHIN Creating a denominator population NEW	Health	Creates a list of the resident population of NZ for a given date, with basic demographic information attached. The methodology is based on that used by Statistics NZ's Census Transformation team (selects people into the population if they have had activity in health, tax, or education data in the last 12 months, then removes people who died or moved overseas).

Discussion Boards
Code Space
Data FAQs
Resources
Links
Calendar
Contacts
Announcements

- On the VHIN Facebook page

VHIN analytical and data services

- Affiliated with VHIN but not part of the 'core' network
- Currently exploring the possibility of providing project, analytical and data services on request
- Contact Sheree Gibb (sheree.gibb@otago.ac.nz) or Nisha Nair (nisha.nair@otago.ac.nz)

IDI information

The screenshot shows the Statistics New Zealand website. The header includes the logo and navigation links: HOME, BROWSE FOR STATS, TOOLS AND SERVICES, METHODS, HELP FOR SURVEY PARTICIPANTS, ABOUT US, Contact us, and Feedback. A search bar is located below the navigation. The main content area is titled "Integrated Data Infrastructure" and contains the following text:

The Integrated Data Infrastructure (IDI) is a large research database containing microdata about people and households. Data is from a range of government agencies, Statistics NZ surveys including the 2013 Census, and non-government organisations. The IDI holds over 166 billion facts, taking up 1.22 terabytes of space – and is continually growing. Researchers use the IDI to answer complex questions to improve outcomes for New Zealanders.

Protecting your privacy
How we keep IDI data safe
Find out how we keep data safe and ensure privacy. Data in the IDI is only used for approved research projects that are in the public interest.

Integrated data helps New Zealanders
How researchers are using the IDI
Find out how the IDI is used by researchers to answer research, policy, and evaluation questions across many subject areas. This research is used to better inform decision-makers to help solve complex issues that affect us all, such as crime and vulnerable children.

View the video below to find out more about the IDI and how it is used.

Better data, better lives: How integrated data is shaping New...

On this page

- [Protecting your privacy](#)
- [Integrated data helps New Zealanders](#)
- [How to use the IDI](#)

- http://www.stats.govt.nz/browse_for_stats/snapshots-of-nz/integrated-data-infrastructure.aspx
- Email access2microdata@stats.govt.nz

Contacts and acknowledgements

- sheree.gibb@otago.ac.nz
- General VHIN enquiries: kate.sloane@otago.ac.nz

Acknowledgements

- Massey, Otago, and Auckland Universities and Ministry of Health
- Statistics NZ's IDI team
- Catalyst project staff